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COMMITTEE ON PAPERS AND PUBLICATIONS:

A. C. HALE,

J. F. GEISLER,

A. A. BRENEMAN, Editor.

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The Meeting Room and Library of the Society are at Room 1, University Building, Washington Square, New York.

The Regular Monthly Meeting is held on the first Friday of every month, at 8 P. M.

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The Committee on Papers and Publications respectfully call attention to the resolutions of the Society, requiring that papers be submitted to the Committee before being read.

Authors will be furnished, gratis, with 20 reprints of each article published in the Journal, if application for the same be made when the article is sent.

Members are requested to give notice of any change of address, or failure in the delivery of the Journal. All communications relating to the Journal should be addressed to the Editor.

A. A. BRENEMAN, 97 Water St., New York.

President C. F. Chandler in the chair.

The minutes of the October meeting were read, as also those of the directors' meeting held October 9th.

Mr. Martin L. Griffin, of Holyoke, Mass., was elected as member.

The Chair read a communication addressed to him by the Mayor of the City calling upon those interested in scientific and educational matters for aid in promoting the International Exposition of 1892. Upon motion of Mr. Wainwright, the matter was made the order for the next meeting.

Mr. Rupp read a letter from Prof. Breneman, and also reported the nominations of the committee. They were as follows:

Corresponding Secretary: M. Alsberg.

Recording Secretary: C. F. McKenna.

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Committee on Nominations: H. Endemann, A. P. Hallock, T. S. Gladding, C. A. Doremus, A. Eimer, T. D. O'Connor.

Board of Directors: M. Alsberg, J. F. Geisler, M. Waldstein, H. Endemann, W. H. Kent, T. D. O'Connor, L. H. Friedburg, C. F. Chandler, W. Rupp.

On motion, the report of the Committee on Nominations was accepted and the nominations were adopted.

Letters were read by the Secretary from Dr. Mendelejeff, of the University of St. Petersburgh, acknowledging his election as an

honorary member of the Society, and from Prof. C. E. Munroe on the subject of reorganization of the Society.

A discussion upon the present state of the Society was then opened. Dr. Alsberg remarked upon the condition of the finances as brought to light at the last directors' meeting. Remarks upon these subjects were made by many members.

The action of the Chemical Section of the American Association for the Advancement of Science was reported by Prof. Vanderburgh and Prof. Nason, both of whom were present.

Dr. Waller moved that the members present be requested to state how much they would pledge for the next year in the way of papers, money and attendance.

On motion of Mr. Geisler a committee of five was appointed to canvas the whole membership of the Society upon the subject. Messrs. Geisler, Doremus, Wainwright, Kent and Waller were appointed by the Chair.

After some remarks by Dr. Kent on amending the By-laws, and by Mr. Wainwright on reorganization, the meeting was adjourned.

CHAS. F. McKENNA,
Recording Secretary.

ANALYSES OF SOME MINERAL WATERS FROM TEXAS.

By C. F. Chandler and E. Waller.

In the Bulletin of the United States Geological Survey No. 32 (Mineral Springs of the United States), among the analyses of Texas waters, appear some partial analyses, with a reference to C. F. Chandler as analyst. The results there quoted were no doubt communicated by the proprietors of the springs, and represent the kind of examination requested by them. Those waters, however, and a few others examined about that time, were sufficiently interesting to induce us to make more extended examinations, which we think may be worthy of record.

The presence of weighable quantities of manganese in the most of these waters, as well as in some cases traces of zinc and copper, first attracted our attention as being not very common constituents of mineral waters. Indeed we have heard the opinion expressed that zinc and manganese were unheard of. But S. Dana Hayes reports the presence of 18.831 grains $ZnSO_4$ in a water from Mercer Co., W. Va. (Am. Chem., V., 277). Prof. Hardin's report on the Rockbridge Alum Springs of Virginia shows weighable quantities of Mn, Zn and Cu in those waters (Am. Chem., IV., 247), and Prof. Mallet finds Mn and Cu in the Capon Springs of W. Va. We have also found Mn in other mineral waters from Virginia, and a search through Dr. Peale's collection of statistics (Bulletin No. 32 above referred to) shows that the presence of manganese is recorded in waters from some 36 different localities, representing fifty or more springs. Many of these are waters from Pennsylvania, reported by Dr. Genth, but the element has been found by other analysts in waters from many other States. It is also reported as a constituent in several European waters, *e. g.*, the Vosges Mountains (C. Rend., Mar., 1880), the Pyrenees, Garegou (C. Rend., LXXXIV., 963), Birresborn (Berichte IX., 987), Bad Helmstedt (Jour. Pr. Chem., 1873, No. 5), etc.

Manganese no doubt has a therapeutical value, but on that point we do not feel competent to express a decided opinion.

The waters have been named according to the places from which they were sent. With the exception of the Houston water, which was alkaline, the waters were neutral, no free acid being discernable by tests with methyl orange or by any other means. In the Waco and Kosse waters, the acid present was insufficient to satisfy all of the bases present, leading to the inference that either basic salts were present, or, what we think is more probable, that the alumina or ferric oxide was combined with some organic acid or compound of unknown composition. A similar case is on record—Orchard Alum Springs of England, Dr. Thresh (*Chem. News*, XLVI., 226).

As to ferric compounds, in many cases the suspicion comes into the mind of the analyst, that oxidation may sometimes have occurred after drawing the water from the spring, but he can only report the conditions which he actually finds.

We give the details of actual quantities of bases found, as well as the probable combinations.

(Parts per 100,000.)

	Wootan No. 1.	Wootan.	Hearne.	Waco.	Bryan.	Kosse.	Houston
Na_2O	22.959	.. ..	34.163	12.405	5.668	1.602	30.621
K_2O	3.589	.....	1.918	1.322	1.257	.....	4.380
Li_2O	.....	.....	.....	.....	.....	.....	trace.
Mg O	22.480	30.000	45.607	18.569	16.036	5.616	26.339
Ca O	43.230	46.470	71.943	44.125	32.477	9.209	55.794
Ba O	.....	.....	.....	.....	.....	.....	trace.
Zn O	.....	.....	.....	.....	trace.	.....	.....
Mn O	0.930	.....	1.350	0.540	0.660	.....	0.167
Fe O	3.287	25.81	25.455	20.801	25.922	1.700	.....
Fe_2O_3	1.696	.....	6.640	6.209	5.347	.....	0.175
Al_2O_3	2.092	.....	6.784	0.650	7.330	6.539	0.185
Cu O	.....	.....	.....	.....	.....	.....	.....
Cl	41.739	60.800	27.886	12.977	6.849	1.834	102.200
SO_3	102.320	135.900	255.430	127.238	134.212	44.940	29.243
P_2O_5	.....	.....	0.140	.....	.....	.....	0.020
SiO_2	5.63	5.550	4.420	5.485	11.055	5.20	2.290
Loss by ig'n	16.50	21.000	25.000	6.500	24.30	3.300	32.000
Res. Evap'n	256.70	340.200	530.000	270.500	317.00	88.680	275.000

(Parts per 100,000.)

	Wootan No. 1.	Hearne.	Waco.	Bryan.	Kosse.	Houston.
Na Cl	43.319	45.934	21.387	10.694	3.023	57.686
$Mg Cl_2$	20.732	----------	----------	----------	----------	62.423
$Ca Cl_2$	----------	----------	----------	----------	----------	32.257
$Mn Cl_2$	----------	----------	----------	----------	----------	0.300
$Cu Cl_2$	----------	----------	----------	----------	----------	trace.
$Na_2 SO_4$	----------	22.463	2.451	----------	9.700	----------
$K_2 SO_4$	6.644	3.547	2.445	2.325	----------	8.108
$Mg SO_4$	41.25	136.822	55.708	48.108	16.848	----------
$Ca SO_4$	104.99	174.720	107.160	78.872	22.365	43.375
$Zn SO_4$	----------	----------	----------	trace.	----------	----------
$Mn SO_4$	1.979	2.871	1.148	1.404	----------	----------
$Fe SO_4$	6.939	53.739	43.912	54.735	3.526	----------
$Fe_2 (SO_4)_3$	4.238	16.602	----------	13.367	----------	----------
$Al_2 (SO_4)_3$	6.976	22.624	2.168	24.440	5.745	----------
$Na_2 HPO_4$	----------	0.281	----------	----------	----------	0.041
$Li HCO_3$	----------	----------	----------	----------	----------	trace
$Ca (HCO_3)_2$	----------	----------	----------	----------	----------	62,575
$Ba (HCO_3)_2$	----------	----------	----------	----------	----------	trace.
$Fe (HCO_3)_2$	----------	----------	----------	----------	----------	0.389
$Si O_2$	5.630	4.420	5.485	11.055	5.400	2.290
$Fe_2 O_3$	----------	----------	6.209	----------	----------	----------
$Al_2 O_3$	----------	----------	----------	----------	4.816	0.185
Loss by ig'n	16.50	25.00	6.500	24.300	3.300	32.00
Res. Evap'n	256.70	530.30	270.500	317.00	88.680	275.00

(Grains per U. S. gallon of 231 cu. in.)

	Wootan No. 1.	Hearne.	Waco.	Bryan.	Kosse.	Houston.
Na Cl	45.263	26.788	12.469	6.236	1.763	33.641
$Mg Cl_2$	12.090	----------	----------	----------	----------	36.404
$Ca Cl_2$	----------	----------	----------	----------	----------	18.812
$Mn Cl_2$	----------	----------	----------	----------	----------	0.175
$Cu Cl_2$	----------	----------	----------	----------	----------	trace.
Na_2SO_4	----------	13.100	1.429	----------	5.657	----------
K_2SO_4	3.875	2.068	1.426	1.486	----------	4.728
$Mg SO_4$	24.056	79.792	32.488	28.056	9.825	----------
$Ca SO_4$	61.228	101.893	62.494	45.997	13.043	25.296
$Zn SO_4$	----------	----------	----------	trace.	----------	----------
$Mn SO_4$	1.154	1.674	0.670	0.819	----------	----------
$Fe SO_4$	4.047	31.340	25.607	31.920	2.056	----------
$Fe_2(SO_4)_3$	2.472	9.861	----------	7.795	----------	----------
$Al_2(SO_4)_3$	4.068	13.192	1.264	14.230	3.350	----------
Na_2HPO_4	----------	0.164	----------	----------	----------	0.024
$Li HCO_3$	----------	----------	----------	----------	----------	trace.
$Ca (HCO_3)_2$	----------	----------	----------	----------	----------	36.492
$Ba (HCO_3)_2$	----------	----------	----------	----------	----------	trace.
$Fe(HCO_3)_2$	----------	----------	----------	----------	----------	0.227
SiO_2	3.283	2.578	3.199	6.447	3.149	1.335
Fe_2O_3	----------	----------	3.621	----------	----------	----------
Al_2O_3	----------	----------	----------	----------	2.809	0.108
Loss by ig'n	9.622	14.579	3.791	14.171	1.924	18.662
Res. Evap'n	149.702	309.260	157.488	175.945	52.369	157.750

COMPARATIVE RESULTS IN THE ANALYSIS OF FATS.

By Russell W. Moore, A. M., M. Sc.

Having had occasion to employ extensively the modification of the Reichert process proposed by Dr. E. Waller (*J. Am. Chem. Soc.*, **8**, 155), it has occurred to the writer that some comparative results with the Hehner or wash process would be of sufficient interest to warrant publication.

The modification, or rather extension of the Reichert process is conducted as follows: The Reichert process is strictly followed out; two and five-tenths grammes of fat are saponified with one gramme of caustic potash, and fifty c. c. of seventy per cent. alcohol. The alcohol, after the saponification is complete, is entirely driven off, the last portions being removed by a current of air and the resulting soap is dissolved with the aid of heat, in fifty c.c. of water, and decomposed with twenty c.c. of dilute sulphuric acid (1:10). The flask is now attached to a condenser, preferably of the well known upright glass worm shape furnished with a bulb tube to prevent mechanical carrying over of the acid, and exactly fifty c.c. are distilled off and titrated with $\frac{N}{10}$ NaOH. The Reichert figure is thus obtained, and a certain portion of the volatile fatty acid has been removed. Fifty c.c. of water are added to the contents of the flask, the distillation is repeated and the distillate titrated, and this same course is continued until a practically neutral distillate of 50 c.c. is obtained, that is, one requiring one-tenth of one c.c. of $\frac{N}{10}$ NaOH, or less, for neutralization. The total amount of acidity of all the distillates is now calculated as butyric acid, and the total per cent. of volatile fatty acid is thus obtained.

The insoluble acids now remain in the flask and the bulb tube or adhere to the sides of the condenser or filter used to filter the

distillate. The portion in the bulb tube and condenser is rinsed into a small flask with a little hot alcohol, and that in the flask is allowed to become solid. The liquid underneath, containing sulphuric acid, potassium sulphate and glycerine, is poured off through the filter that received the original distillate. The fatty acids are then treated with hot water several times, allowing them to cool into a cake before pouring the wash water through the filter. When the wash water shows no reaction for sulphuric acid the washing is complete. Three washings of about 100 c. c. each usually suffice for this purpose. The rinsings of the condenser are now added to the insoluble fatty acids, the filter is exhausted with hot alcohol to remove adhering fatty acid, the alcohol is expelled and the contents of the flask are dried to constant or slightly increasing weight at 105°C. The per cent. of insoluble fatty acids can then be calculated.

Bumping during distillation can be avoided by using spirals of coarse platinum wire; these can be weighed with the flask, and require no further attention.

A blank test of the reagents used should also be made and any acidity yielded by them in the distillate allowed for.

The method conducted as above furnishes:

(1.) The Reichert figure.

(2.) The soluble fatty acids.

(3.) The insoluble fatty acids.

The advantages claimed for this method are as follows:

(1.) A combination of the two most valuable and reliable methods, the Reichert and the elaborated Hehner into one.

(2). Greater ease and rapidity of manipulation than the Dupré method.

(3). Avoidance of loss of insoluble fatty acids due to transfer of the fatty acids from the flask in which the fat was originally weighed. The filter used is a small one and can easily be exhausted with hot alcohol.

(4.) Necessity of only one standard solution instead of four, as in the Dupré process. The $\frac{N}{10}$ Na OH is a very permanent solution and the use of alcoholic K OH which is subject to daily and even hourly change is avoided.

(5.) Accuracy of results. This is shown by the following figures:

BUTTER.

	Wash Process.		Waller's Process.	
	Per Cent. of Soluble Acids.	Per Cent. of Insoluble Acids.	Per Cent. of Soluble Acids.	Per Cent. of Insoluble Acids.
Jersey Butter	6.37	87.67	6.30	87.54
Rancid Butter	6.53	88.48	6.49	88.56
Dairy Butter, November	5.42	87.71	5.61	87.74
Holstein Butter	5.11	89.00	5.28	88.96
Native Butter	5.76	87.09	5.80	87.10
Devon Butter	6.86	87.79	6.86	87.76
OLEOMARGARINE.				
No. 1124	0.16	95.64	0.16	95.50
" 135	0.27	95.68	0.28	95.40
" 492	0.69	94.96	0.67	94.92
" 137	0.18	95.98	0.14	95.94
" 999	0.36	95.12	0.28	95.14
" 686	0.20	96.02	0.23	96.00
" 493	1.68	93.52	1.51	93.78
OILS.				
Olive Oil	0.34	94.82	0.28	94.58
Mustardseed Oil	------	95.66	------	95.61
Porpoise Jaw Oil	16.98	71.93	16.70	71.98
Cocoanut Oil	7.00	80.87	4.92	83.12

The results above given all show a satisfactory agreement with one exception, and the two processes may be considered to give practically identical results. The exception in this case is cocoanut oil. It will be noticed that the sum of the fatty acids by both processes is practically the same, but that more soluble acid is extracted by the wash process than by distillation. The results

obtained by both of the processes on this oil were far from satisfactory. In the wash process 2.495 grammes of fat were used and twenty-five washes of the fatty acids were made, each consisting of 100 c. c. of hot and 25 c. c. of cold water; the last washing required three-tenths of one c. c. of $\frac{N}{10}$ NaOH for neutralization and the acidity of each successive wash varied irregularly. By the distillation process the condenser became almost clogged with the fatty acid that volatilized and condensed on its walls. This, of course, was reckoned as insoluble fatty acid. Owing to the fact that the washings in the wash process are filtered hot, while the distillate in the distillation process is filtered cold, the soluble acids in the first, in the case of an oil like cocoanut that contains a large proportion of fatty acids soluble with difficulty in water, are higher than in the latter process. In the analysis of butter and oleomargarine the writer has found the distillation process of great service and in every way reliable.

The results above given were all obtained by the writer in the laboratory of Dr. E. Waller, New York.